

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	60186	(MEMS or MCM or microelectronic) and (hole or opening or via or trench or recess or aperture)	US-PGPUB; USPAT	OR	ON	2005/02/15 08:45
L2	3215	1 and @ad<"20011220" and (slope or sloped)	US-PGPUB; USPAT	OR	ON	2005/02/15 09:25
L3	7698	(MEMS or MCM or microelectronic) and (width same (hole or opening or via or trench or recess or aperture))	US-PGPUB; USPAT	OR	ON	2005/02/15 08:45
L4	731	3 and @ad<"20011220" and (slope or sloped)	US-PGPUB; USPAT	OR	ON	2005/02/15 09:20
L5	259	3 and @ad<"20011220" and (inclined)	US-PGPUB; USPAT	OR	ON	2005/02/15 09:01
L6	187	5 not 4	US-PGPUB; USPAT	OR	ON	2005/02/15 09:08
L7	1	(frank near2 geefay) and @ad<"20011220" and (slope or sloped)	US-PGPUB; USPAT	OR	ON	2005/02/15 09:22
L8	0	(qing near2 gan) and @ad<"20011220" and (slope or sloped)	US-PGPUB; USPAT	OR	ON	2005/02/15 09:22
L9	0	(qing near2 gan) and @ad<"20011220" and (inclined)	US-PGPUB; USPAT	OR	ON	2005/02/15 09:21
L10	0	(frank near2 geefay) and @ad<"20011220" and (inclined)	US-PGPUB; USPAT	OR	ON	2005/02/15 09:22
L11	0	(frank near2 geefay) and (inclined)	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/15 09:23
L12	0	(qing near2 gan) and (slope or sloped)	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/15 09:23
L13	0	(qing near2 gan) and (inclined)	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/15 09:23
L14	0	(frank near2 geefay) and (slope or sloped)	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/15 09:23
L15	650	438/667,668,673,928.ccls. and @ad<"20011220"	US-PGPUB; USPAT	OR	ON	2005/02/15 09:26
L16	2059	257/774-776.ccls. and @ad<"20011220"	US-PGPUB; USPAT	OR	ON	2005/02/15 09:26

US-PAT-NO: 6265245

DOCUMENT-IDENTIFIER: US 6265245 B1

TITLE: Compliant interconnect for testing a semiconductor die

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Detailed Description Text - DETX (6):

Next, as shown in FIG. 1C, etched pockets 26 are formed in the substrate 10 using the first etch mask 16 (FIG. 1B). The pockets 26 can be etched in the substrate 10 using a wet or dry isotropic, or anisotropic, etch process. The etch stop 12 formed in the substrate 10 can be used to control the depth of the pockets 26. For a substrate 10 formed of silicon, a wet etchant such as a solution of KOH and H₂O can be utilized to anisotropically etch the grooves 26. This type of etching is also known in the art as bulk micro-machining. The etched pocket 26 include sloped sidewalls 28. The slope of the sidewalls 28 is a function of the different etch rates of monocrystalline silicon along the different crystalline orientations. This etch angle is approximately 54.degree..

Detailed Description Text - DETX (7):

Following formation of the etched pockets 26, the first etch mask 16 (FIG. 1B) is stripped. With the first etch mask 16 formed of silicon nitride, the mask can be stripped using a wet etchant such as H₃PO₄ that is selective to the substrate 10. As is apparent, the etch step for forming the etched pockets 26 can be performed after formation of the contact structure 24 (FIG. 1F). As will become apparent, the etch step for forming the etched pockets 26 controls a thickness of a membrane portion 42 (FIG. 1F) of the contact structure 24. In addition, as shown in FIG. 1CC, the etch process is controlled such that a width of the opening "y" on the surface 18 of the substrate 10 is selected to achieve a depth "z" and a width "x" at the bottom of the pocket 26.

Detailed Description Text - DETX (10):

For an anisotropic etch, in which the etch rate is different in different directions, an etchant solution containing a mixture of KOH and H₂O can be utilized. This results in the penetrating projections 30 being formed as blades having sidewalls that are sloped at an angle of approximately 54.degree. with the horizontal. As with the etched pockets 26, the slope of the sidewalls 28 of the penetrating projections 30 is a function of the different etch rates of monocrystalline silicon along the different crystalline orientations. The surface of the substrate 10 represents the (100) planes of the silicon which etches faster than the sloped sidewalls that represent the (111) plane. In addition to sloped sidewalls, the penetrating projections 30 include a tip portion. The width of the tip portion is determined by the width of the masking blocks 32 and by the parameters of the etch process. FIG. 6 clearly

shows the shape of the penetrating projections 30.

Detailed Description Text - DETX (14):

Next, as shown in FIG. 1E, the second etch mask 29 is stripped and a third etch mask 37 having masking blocks 36 is formed over the penetrating projections 30. The etch mask 37 and masking blocks 36 can be formed of a material such as silicon nitride as previously explained. The etch mask 37 is used to etch the substrate 10 along a profile 38 represented by the dotted lines to form raised contact structures 24 (FIG. 1F). As before, either a wet or dry isotropic or anisotropic etch process can be used to etch the substrate 10. Typical etching techniques comprise wet anisotropic etching with a mixture of KOH:H₂O. With an anisotropic etch the sidewalls 40 of the contact structures 24 will be sloped at an angle of about 54.degree. with the horizontal. As shown in FIG. 1F, this forms the contact structures 24 with sloped sidewalls and a generally pyramidally shaped cross section.